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(54) Coating of compressed board materials

(57) Compressed board material, such as chipboard, is first treated with a polyester resin to provide a sealing coat, and is then sprayed electrostatically with a powdered organic polymeric material which is cured to a hard coat which is crack-resistant yet has some flexibility. The curing may be an infrared heat source.

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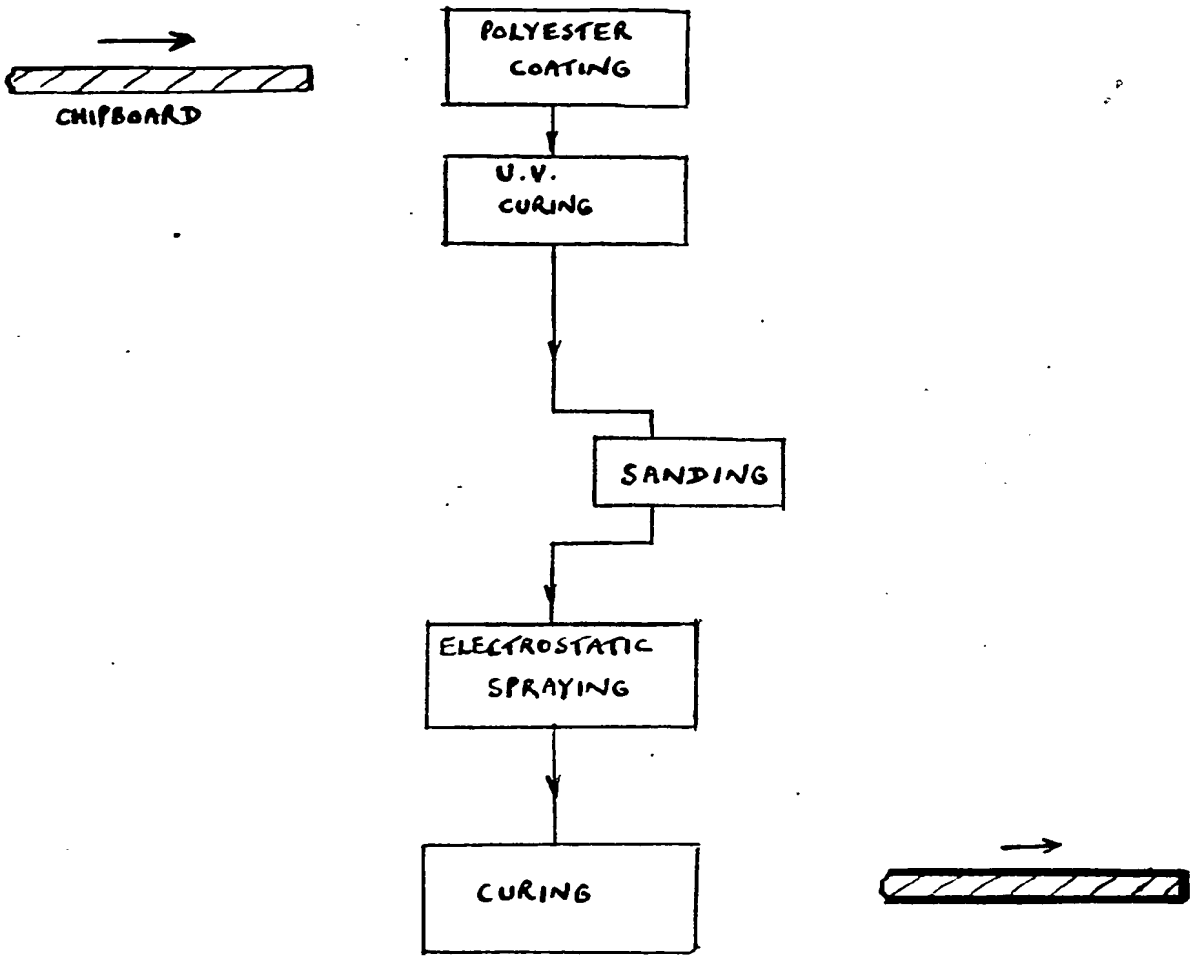

SPECIFICATION

Coating of compressed board materials

This invention relates generally to improved compressed board materials and to the treatment of compressed board materials, such as chipboard, and is concerned primarily with the application of a powder coating to compressed board which is then cured to give a smooth even surface which is resistant to damage.

It is already known to apply an epoxy resin powder coating to metal surfaces by an electrostatic process. The metal surface is first treated with iron phosphate for example, it is passed through an electrostatic spray which applies the powder, and the powder is then cured by a stoving treatment. Naturally, with a metallic work-piece, the metal itself provides the necessary electrical conductivity for an electrostatic process to be used satisfactorily.

Attempts have been made to achieve the same results with chipboard using such powders. However, the high temperature at which these powders have to be cured, namely temperatures of at least 150°C. and more usually 180°C., destroy or at least adversely affect the chip-board substrate. These high curing temperatues cause breakdown in the glue within the chipboard and have other adverse effects on the chipboard such that it has been impossible to obtain a product which is acceptable either in terms of surface finish or in terms of a distortion-free product.

It has now been found, in accordance with the present invention, that it is possible to produce a powder-coated compressed board material using a curable coating powder provided that one starts with a suitably treated substrate.

It is an object of the present invention to produce a heat-cured powder-coated compressed board material which has a surface finish which is resistant to impact, heat, scratching, etc., which can be smooth and even, glossy, matt or textured, and which is strongly adherent to the board substrate.

The crux of the invention lies in the surprising discovery that one can use organic polymeric powders for the coating of the board and with curing at temperatures of the order of 180°C. if one first treats the board by coating it with a polyester resin.

In accordance with the invention there is provided manufactured compressed board characterised in that it is coated with a layer of polyester resin overlaid with a cured coating of powdered organic polymeric material.

Also in accordance with the present invention there is provided a method of producing coated manufactured compressed board characterised in that a compressed board substrate is first coated with a layer of polyester resin, and is then coated with a powdered organic polymeric material which is cured to a hard coat.

The curing of the powder-coated board is preferably at a temperature of at least 150°C. and preferably of the oder of 180°C.

It is important that the board substrate should have a low moisture content and the invention is particularly applicable to chipboard having a density of greater than 600 Kg/ cu.m. and preferably greater than 650 Kg/cu.m.

The polyester resin layer may be applied by a reverse roller coating treatment, with subsequent curing of the polyester resin by ultra-violet radiation.

According to a preferred feature of the invention, the board coated with polyester resin is sanded before the powder is applied, for example by an electrostatic spray, in order to achieve a more even spread of the powder applied in the spray treatment.

In order that the invention may be more fully understood, one presently preferred embodiment of process in accordance with the present invention will now be described by way of example and with reference to the accompanying schematic drawing which illustrates the process steps.

Although the method of the present invention is applicable to other manufactured compressed board materials, such as hardboard for example, it is particularly applicable to chipboard of relatively high density which, in consequence, has very little air space within its structure and therefore a low moisture content. The need for a low moisture content in the board is necessary in order to enable a satisfactory electrostatic charge to be built up in the powder coating stage. Chipboard having a minimum density of 600 Kg/ cu.m. sould be used and preferably chipboard with a density greater than 650 Kg/ cu.m. The chipboard is first coated with polyester resin, for example by a reverse roller coating process, in order to seal the surface and to fill any surface blemishes or roughness. The polyester coating is then cured, for example by ultraviolet radiation. A coating having a density of the order of 0.015 grams per sq.cm. after curing has been found to be particularly satisfactory. This initial coating also reduces the amount of heat which can pass through to the board substrate in the subsequent powder curing stage.

The polyester resin coated chipboard is then sanded in order to provide a slightly roughened surface to assist in the adhesion of the powder coating in the subsequent stage and in order to provide for an even spread of the powder. The sanded chipboard is then passed through a spray booth in which the powder particles are electrically charged in such a way that they are attracted to the substrate. The powder used for coating the chipboard may be any suitable organic polymeric material based upon a resin or polyurethane, and which is heat curable to a fused coating. The low moisture content in the chipboard enables an electrostatic build-up to take place and the polyester resin also acts as an attractant to the powder particles. It has been found that chipboard treated in this way will attract the powder particles electrostatically in the absence of any metallic surface. After passing through the spray booth the powder-coated chipboard is then cured at a temperature of at least 150°C. and preferably of the order of 180°C. It has been found that there is no breakdown in the glue content within the chipboard even at temperatures as high as 180°C. Such temperatures would cause irreversible damage to chipboard in the absence of

the preliminary polyester resin coating treatment.

The curing of the powder under the effect of heat may be accomplished by a convection or radiation heat source. Preferably, an infra-red heat source is used, as the high curing temperature is then more easily concentrated in the surface of the product with less heat passing to the substrate. In a preferred arrangement the powder-coated board is suspended with its main faces vertical and is passed through an infra-red oven with heaters on each side of the board in order to cure both faces simultaneously.

It is not necessary that the electrostatic spray process should follow on immediately after the polyester coating treatment and the two processes can be carried out quite independently. The powder application and subsequent curing stages can take as little as 2 minutes for example, using infra-red curing of the powder.

The resulting product has a smooth or textured, even surface finish which has a certain flexibility and particularly strong adhesion to the chipboard substrate. The inherent flexibility means that the surface is crack-resistant even under a hammer blow. It is possible to cut the chipboard by sawing for example without any rough edge being produced and without any chipping of the material coating along the line of the saw-cut. The surface is also extremely resistant to impacts and scratches. One can achieve either a matt or glossy surface depending upon the particular powder used, and coloured suface finishes are also obtainable with appropriate powders.

Such powder-coated board has wide application within the building industry, within the furniture industry and elsewhere. The finished product is also fire-resistant, and this makes it particularly valuable in both the building and furniture industries, for both domestic and industrial application.

CLAIMS:

1. Manufactured compressed board characterised in that it is coated with a layer of polyester resin overlaid with a cured coating of powdered organic polymeric material.

2. Board as claimed in claim 1, characterised in that the organic polymeric material comprises an epoxy resin.

3. Board as claimed in claim 1 or 2, characterised in that the board substrate has a density of greater than 600 Kg/ cu.m.

4. Board as claimed in claim 3, characterised in that the density is greater than 650 Kg/ cu.m.

5. Board as claimed in any preceding claim, characterised in that the board substrate is chipboard.

6. Board as claimed in any preceding claim, characterised in that the polyester resin layer has a density of the order of 0.015 grams per sq. cm.

7. A method of producing coated manufactured compressed board characterised in that a compressed board substrate is first coated with a layer of polyester resin, and is then coated with a powdered organic polymeric material which is cured to a hard coat.

8. A method as claimed in claim 7, characterised in that the powder is aplied by an electrostatic spray process.

9. A method as claimed in claim 7 or 8, characterised in that the polyester resin is cured by ultra-violet radiation.

10. A method as claimed in claim 7, 8 or 9, characterised in that the curing of the organic polymeric material coating the temperature of the organic polymeric material is at least 150°C., and preferably of the order of 180°C.

11. A method as claimed in any of claims 7 to 10, characterised in that the curing of the organic polymeric material is effected by infra-red radiation.

12. A method as claimed in claim 11, characterised in that the powder-coated board is passed through a curing chamber with the board suspended vertically whereby both sides of the board are subjected to radiation.

13. A method as claimed in any of claims 7 to 12, characterised in that the polyester resin layer, after hardening is sanded before the powder is applied.

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